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CANVIRO CONSULTANTS

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VHB Research & Consulting Inc.
720 Spadina Avenue
Suite 501
Toronto, Ontario
M5S 2T9

Attention Mr. T. Burrell:

Dear Terry:

RE: OWMC WASTE IN STORAGE STUDY

Enclosed are ten (10) copies of our report on Waste in Storage in Ontario. Quantities discussed in the report are accumulated stocks of stored waste. Our research indicates that minimal annual flows of waste are sent to storage.

Results of our survey of the CANVIRO database companies were extrapolated to yield an estimated 1,800 tonnes of accumulated waste in storage in the Province. This is considered an underestimate as our survey did not pick-up any large stockpiles of waste, and discussions with MOE personnel indicate that there are some remaining stockpiles of waste in the Province. However, our research also indicated that most or all of these will be depleted within the next year or two, hence it is likely that a minimal amount of accumulated stored waste will remain after 1990.

I have enjoyed working on this interesting study. Thank you again for the opportunity of being of continued service to the OWMC.

Sincerely

Maria Kelleher, M.Eng, P.Eng

lb/TORR18/041

Enclosure
cc: A. Veel - OWMC

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TABLE OF CONTENTS

		Page
EXECUTIVE SUMMARY		i
CHAPTER 1:	INTRODUCTION	
	1.1 Background	1-1
	1.2 Objectives	1-1
	1.3 Report Structure	1-2
CHAPTER 2:	STUDY METHODOLOGY	
	2.1 Methodology	2-1
	2.2 Literature Search	2-2
	2.3 Sources of Information	2-3
	2.3.1 Generator Registration Database	2-3
	2.3.2 CANVIRO Database	2-3
	2.3.3 Ministry of the Environment District Offices	2-4
	2.3.4 Telephone Survey	2-4
	2.3.5 Canadian Chemical Producers Associations	2-4
CHAPTER 3:	STUDY RESULTS	
	3.1 Generator Registration Database	3-1
	3.1.1 General	3-1
	3.1.2 Telephone Survey	3-3
	3.1.3 Comments on the Generator Registration Database	3-7
	3.2 The CANVIRO Database	3-9
	3.2.1 Preliminary Review of CANVIRO Database	3-9
	3.2.2 CANVIRO Database Telephone Survey	3-9
	3.2.3 Survey Conclusions	3-14
	3.3 MOE District Offices	3-16
	3.4 Canadian Chemical Products Association Survey	3-17
	3.5 Estimate of Waste in Storage in Ontario	3-17
CHAPTER 4:	CONCLUSIONS AND RECOMMENDATIONS	
	4.1 Conclusions	4-1
	4.2 Recommendations	4-2
CHAPTER 5:	REFERENCES	5-1

APPENDIX A - List of Contacts
APPENDIX B - MOE Waste Classes

LIST OF TABLES

Table Number		Page
3.1	Summary of Generator Registraton Database Information on Waste in Storage	3-2
3.2	Generator Registration Database Summary of Information by Waste Quantity	3-3
3.3	Summary of Information SIC 29 (Primary Metals)	3-4
3.4	Summary of Storage Survey Results	3-10
3.5	CANVIRO Survey Summary of Waste Quantities Stored and Reasons for Waste Storage	3-15

EXECUTIVE SUMMARY

PURPOSE OF THE REPORT

The purpose of this report is to quantify the amount of subject waste in storage in Ontario at this time.

SCOPE AND METHOD

Information was obtained from the modified MOE generator registration database on the quantity of waste registered as going to storage in the Province. Twenty companies were identified as sending greater than five tonnes per year of waste to storage. Each of these companies was contacted by phone to discuss any waste in storage at their facilities, and reasons why waste was stored rather than disposed of.

The CANVIRO database generated during previous studies (CANVIRO 1985, 1987) was analyzed to identify companies who reported long term storage of waste during previous interviews. Forty four companies from this database were contacted by phone to discuss waste storage practices.

MOE district offices were contacted to discuss waste storage practices in their local area, and also to identify any changes in these practices resulting from the revisions to Regulation 309, which took effect in September 1986.

The results of the above interviews were extrapolated to estimate a total quantity of waste in storage in the Province.

PREMISES AND POSTULATES

It was assumed for the purpose of the study that information obtained during telephone interviews with various MOE and private sector representatives was accurate.

STATUS OF DATA

Most of the information in this report was obtained through telephone interviews with MOE and industry representatives. It was considered to be reasonably accurate.

MAIN FINDINGS

The generator registration database indicated that 41,312 tonnes of waste is stored in the Province by 86 waste generators. Of this total, 20 generators stored greater than 5 tonnes each, for a total of 41,234 tonnes. The remaining 78 tonnes was stored by 66 generators. A survey of the 20 largest generators established that 40,389 tonnes of the 41,312 tonne total is not truly stored material which will require disposal at a future time. Most of the above waste streams were annual production quantities where the disposal method was incorrectly coded as storage. In some cases, accumulated quantities were registered, where the waste was stored on-site because of disposal problems.

The CANVIRO database indicated that of the 1217 companies interviewed, 44 reported storing greater than 5 tonnes per year of waste when interviewed in 1983, 1984 and 1986. Of this total, 18 companies were in SIC 37 (Chemicals and Chemical Producers) and 8 were in SIC 29 (primary metals).

Each of the above companies was contacted by phone. Of the 44 companies surveyed, 32 no longer stored waste, 1 company was out of business, and 1 company would not provide any information. Three companies stored radioactive wastes, which are outside the scope of this work. Seven companies stored a total of 148 tonnes of waste for a variety of reasons. Of the seven companies currently storing waste, two were doing so because of disputes with the MOE regarding classification of the waste as hazardous rather than non-hazardous. Eventual disposal of this waste would not present

a problem in these cases as both waste streams can be handled by existing waste treatment facilities in the Province. Three other companies storing wastes were in the process of disposing of old waste stockpiles and anticipated that these would be totally removed in 1988. The remaining two companies stored relatively small quantities (1 and 15 tonnes) of waste, because of disposal difficulties. One relatively large stockpile of waste (70 tonnes) was identified in the CANVIRO database survey. A second large stockpile of waste (400 tonnes) was identified during discussions with MOE personnel. Both of these stockpiles will be disposed of in the next two years.

Discussions with MOE District Office staff indicate that firms are actively discouraged from storing wastes for long periods of time. The only acceptable reason for storage periods in excess of 90 days is to accumulate a quantity which can be disposed of economically.

It was concluded from discussions with firms identified in the generator registration and CANVIRO databases, and also with MOE staff, that stockpiles of accumulated waste which may have been stored for a number of years prior to the revisions to Regulation 309 have been significantly depleted. This has resulted from industries increased awareness of storage being an unacceptable waste management practice, and also from increased MOE efforts to discourage continued storage of wastes in the Province. Hence annual flows of waste going to storage as a waste handling method are minimal.

Approximately 923 tonnes of accumulated waste in storage was identified in the generator registration database. An additional 148 tonnes of accumulated stored waste was identified through a survey of the CANVIRO database. An additional stockpile of 400 tonnes of accumulated waste was

identified in Eastern Ontario by an MOE official. This source had not been identified in either of the above databases. The present study identified at lease 1,471 tonnes of stored waste in the Province from the various sources consulted.

The CANVIRO database results could be extropolated to yield an estimated total accumulated stored waste quantity of 1,800 tonnes using a simple random survey technique. However because of the identified nature of waste storage, (ie. that a few isolated companies have large stockpiles) a representative sample was difficult to develop for prediction purposes, and there are limitations on the number of industries which can be sampled for practical reasons. Therefore it is suspected that the total quantity of waste stored is greater than the estimated 1,800 tonnes, depending on the number of unidentified isolated industries (outliers) which exist. Based on information obtained during the study an upper bound of 3,000 to 4,000 tonnes on this estimated total appears reasonable. The total does not include PCB wastes, waste stored in lagoons waste stored by the non- manufacturing service sector,or wastes stored for a short period of time until an economical quantity has been accumulated for disposal.

It is expected that the quantity of accumulated stored waste will continue to decrease in the coming years, as stockpiles of waste accumulated over a number of years are depleted.

Chapter 1

INTRODUCTION

This chapter includes descriptions of the purpose of the study, and of the report structure.

1.1 BACKGROUND

The Ontario Waste Management Corporation (OWMC) was established as a provincial Crown Agency in 1981 with a mandate for the implementation of a province-wide program for the management of hazardous and liquid industrial waste as currently defined in Regulation 309, and referred to as "subject waste" or simply "waste" in this study.

A critical component of the OWMC FDP (Facilities Development Program) involved the assessment of the types and quantities of subject wastes generated in Ontario. The assessment data will be used to support planning of waste management facilities to be built by OWMC, and also of programs that will affect the generation and management of waste, such as encouragement of recovery, recycling and re-use practices.

1.2 OBJECTIVES

As part of the data collection effort, Victor and Burrell retained CANVIRO Consultants on behalf of the OWMC to undertake a study to estimate the quantities of subject waste in storage in Ontario.

The study involved an analysis of information obtained from a modified version of the generator registration database on wastes in storage in Ontario, an analysis of information obtained from the CANVIRO Phase I, II, and III interviews with the manufacturing sector in Ontario, carried out in

1984 and 1986, and confirmation of the data obtained through a telephone survey. The results of this survey were used to re-assess the quantity of waste in long term storage in the Province.

1.3 REPORT STRUCTURE

The methodology employed in conducting this study is described in Chapter 2. Study findings are presented and discussed in Chapter 3. Chapter 4 presents conclusions and recommendations developed as a result of the study. References are included in Chapter 5. Appendix A includes a listing of people contacted during the study, and a copy of the MOE waste classes is included in Appendix B.

Chapter 2

STUDY METHODOLOGY

This chapter describes the various sources from which information contained in the study was obtained, and the methodology used to estimate the quantity of subject waste currently in storage in Ontario.

2.1 METHODOLOGY

The methodology employed to estimate the quantity of waste in storage in Ontario is as follows:

1) A printout was obtained of all wastes registered as going to storage (Handling Code "K") in the generator registration database. Generators who registered greater than 5 tonnes of waste going to storage were identified and contacted by phone to determine if their waste disposal practices had been coded correctly, and also to determine if a stockpile of waste was stored on-site, and why waste was stored rather than disposed of.

2) Information was obtained on companies who registered less than 5 tonnes of waste per year in storage on the generator registration database. As the total quantity of material involved was relatively low, this segment of the database was not pursued further.

3) It was a requirement of the revisions to Regulation 309 that the MOE be notified of intent to store any waste for a period in excess of 90 days. MOE District Offices were contacted to determine the level of information available on waste in storage in each of the districts.

4) A computerized literature search was carried out to determine if any material was published on this topic, to augment in-house information.

5) Results of the CANVIRO industry interviews carried out in 1983, 1984 and 1986 were analysed, and storage practices reported in these interviews assessed. All companies reporting greater than 5 tonnes per year of waste going to storage in the CANVIRO database were identified, and contacted by phone to confirm current waste generation and disposal practices.

6) Information obtained from the CANVIRO database and confirmed by phone survey was used to extrapolate the total quantity of waste in storage for the manufacturing sector (major SIC groups 10-39). This was supplemented by information from the generator registration database, where appropriate.

7) Information on the non-manufacturing sector was taken directly from the generator registration database. This information was assumed to include this total sector, and was not extrapolated to yield a higher total.

2.2 LITERATURE SEARCH

In-house literature searches were conducted using the Canadian Institute of Scientific and Technical Information (CISTI) Canadian Online Enquiry (CAN/OLE) System. Database selection was based upon CANVIRO's past experience conducting literature searches. Specific databases examined included:

COAL	Coal Abstracts
EI	Engineering Index
EIM	EI Engineering Meetings

ELIAS	Environmental Libraries Automated System
MICROLOG	Microlog Index
NTIS	National Technical Information Service
STATCAN	Statistics Canada Catalogue Online

Abstracts obtained as a result of the literature searches were carefully reviewed, however, no references containing pertinent information were identified.

2.3 SOURCES OF INFORMATION

2.3.1 Generation Registration Database

The OWMC had obtained a modified copy of the Regulation 309 generation registration database from the MOE and this information was available for CANVIRO's use at the time of this study. Work carried out using the generator registration database is discussed in detail in Chapter 3. Names and phone numbers of generators of interest from the generator registration database were provided to CANVIRO by the OWMC, along with the quantities and types of waste registered as going to storage for each generator.

2.3.2. CANVIRO Database

Information compiled during previous studies (CANVIRO 1985, 1987) was condensed into one CANVIRO database and was analyzed to:

1) Identify companies reporting wastes going to storage.

2) Identify the type and quantity of waste going to, or in storage.

3) Identify specific SIC groups which appeared to routinely store wastes for long periods of time.

2.3.3 MOE District Offices

It was a requirement under the revisions to Regulation 309 that any company intending to store waste for a period in excess of 90 days notify both the local MOE office, and the MOE Waste Management Branch, of its intention to do so. MOE District Offices were contacted to determine if this information was filed in a form suitable for use in this study. General trends in waste storage practice in each MOE district were also discussed with the appropriate MOE abatement officers.

2.3.4 Telephone Survey

Waste generators identified from both the generator registration and CANVIRO databases as storing greater than 5 tonnes per year of wastes were contacted directly by phone to determine if this disposal method was still being practiced.

2.3.5 Canadian Chemical Producers Association

The Canadian Chemical Producers Association (CCPA) was updating a survey on waste generation and disposal practices by the industry across Canada at the time of this study. The survey was discussed with Association representatives, to determine its applicability to the present study.

Chapter 3

STUDY RESULTS

This chapter presents the findings of the various components of the study, and how these were used to estimate the quantity of material in storage in Ontario.

3.1 GENERATOR REGISTRATION DATABASE

3.1.1 General

The Generator Registration database information on waste registered as going to storage in Ontario is summarized in Table 3.1. The table indicates that a total of 41,312 tonnes per year of material was registered as going to storage in Ontario. Of the total, 36,382 tonnes was contributed by the manufacturing sector (SIC groups 10-39) and the remaining 4930 tonnes was contributed by the non-manufacturing sectors (SIC groups 0-9, and 40-99).

Information on the numbers of generators in various waste generation size ranges is presented in Table 3.2. Of the 86 generators reporting 41,312 tonnes of waste going to storage, 20 generators reported greater than 5 tonnes each, for a total of 41,234 tonnes, 10 generators reported between 3 and 5 tonnes of waste going to storage, for a total of 38 tonnes, and the remaining 56 generators reported less than 3 tonnes of waste each, for a total of 40 tonnes per year.

From the above preliminary analysis, it was decided to pursue each of the 20 larger generators individually, and obtain a better understanding of the material going to storage, and why it was stored rather than disposed of. As the smaller generators (less than 5 tonnes) accounted for a total of only 78 tonnes of waste in the Province, and many of these streams were less than 1 tonne, these were not pursued further during the present study.

Table 3.1

Summary of Generator Registration Database

Information on Waste in Storage

MOE WASTE CODE	UCD NUMBER	WASTE DESCRIPTION	ANNUAL TONNEAGE OF WASTE GOING TO STORAGE IN ONTARIO BY SIC GROUP														
			SIC #0	SIC #4	SIC #6	SIC #8	SIC #9	SIC #11	SIC #15	SIC #16	SIC #24	SIC #25	SIC #27	SIC #29	SIC #30	SIC #31	SIC #32
112	111	Acids & Heavy Metals	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
121	121	Alkaline & Heavy Metal Solutions	0	0	0	0	0	0	0	0	0	0	0	0	0	0	455
143	518	Steel Making Residues & Solids	0	0	0	0	0	0	0	0	0	0	0	33552	0	0	0
145	454	Paint Wastes	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
146	151	Inorganic Sludges & Slurries	0	0	4701	0	0	0	0	0	0	0	0	0	3	0	0
211	214	Aromatic Solvents & Residues	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
212	214	Aliphatic Solvents & Residues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
213	214	Petroleum Distillates	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
241	211	Halogenated Solvents and Residues	0	0	6	0	0	0	0	0	0	0	0	4	1	0	0
242	241	Halogenated Pest & Herbicides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
251	282	Waste Oils	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
252	281	Waste Crankcase Oil & Lubricants	3	0	2	5	0	0	0	0	0	32	0	1440	2	6	3
253	289	Emulsified Oils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
267	224	Organic Acids	0	0	0	0	0	0	0	18	0	0	0	0	0	0	0
312	528	Pathological Wastes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
321	529	Explosives	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		TOTALS	3.5	6.0	4709.8	4.6	0.2	0.1	4.5	18.0	0.4	39.9	0.3	34997.9	10.4	6.3	462.0

MOE WASTE CODE	UCD NUMBER	WASTE DESCRIPTION	ANNUAL TONNEAGE OF WASTE GOING TO STORAGE IN ONTARIO BY SIC GROUP														TOTALS
			SIC #33	SIC #35	SIC #37	SIC #40	SIC #45	SIC #49	SIC #57	SIC #63	SIC #81	SIC #82	SIC #83	SIC #85	SIC #86	SIC #97	
112	111	Acids & Heavy Metals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8.1
121	121	Alkaline & Heavy Metal Solutions	0	0	0	0	0	48	0	0	0	0	0	0	0	0	503.3
143	518	Steel Making Residues & Solids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33552.0
145	454	Paint Wastes	0	0	5	0	0	0	0	0	0	0	0	0	0	0	8.7
146	151	Inorganic Sludges & Slurries	0	324	0	0	0	0	0	0	0	0	0	0	0	0	5028.1
211	214	Aromatic Solvents & Residues	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6.2
212	214	Aliphatic Solvents & Residues	1	0	0	0	0	2	0	0	0	0	0	0	0	0	4.0
213	214	Petroleum Distillates	0	0	4	0	1	0	0	0	0	0	0	0	0	8	7.1
241	211	Halogenated Solvents and Residues	0	0	5	0	0	0	0	0	0	0	0	0	0	0	24.3
242	241	Halogenated Pest & Herbicides	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6
251	282	Waste Oils	0	0	0	0	0	125	0	0	0	0	0	0	2	0	132.8
252	281	Waste Crankcase Oil & Lubricants	0	0	24	0	4	1	0	0	2	1	1	0	0	0	1528.7
253	289	Emulsified Oils	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.3
267	224	Organic Acids	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18.0
312	528	Pathological Wastes	0	0	0	0	0	0	0	0	0	0	0	0	8	0	7.9
321	529	Explosives	0	0	480	0	0	0	0	0	0	0	0	0	0	0	480.0
		TOTALS	0.6	324.0	518.0	0.4	5.1	176.5	0.4	0.2	2.2	1.6	0.9	0.1	10.0	8.3	41312.2

Table 3.2
GENERATOR REGISTRATION DATABASE SUMMARY OF INFORMATION BY WASTE QUANTITY

	Number of Generators	Quantity of Waste Reported Going to Storage by Generators	Total Waste Quantity in Storage (tonnes)
	20	5 tonnes or greater	41,234
	10	3-5 tonnes	38
	56	0-3 tonnes	40
Total	86		41,312

3.1.2 Telephone Survey

A telephone survey was carried out ~~of~~ on each of the 20 generators who registered greater than 5 tonnes of waste going to storage. The results of the survey are discussed below by SIC grouping.

SIC 29 (Primary Metals)

SIC 29 registered the largest volume of waste going to storage, accounting for 34,998 tonnes, or 85% of the total. Four companies contributed to 34,992 tonnes of this total. Information on the four companies is summarized in Table 3.3, which indicates that most of the material is MOE Waste Code 143 N (registerable solids, residues from steel making) with some MOE Waste Code 252 L (waste oil), MOE Waste Code 143 T (leachate toxic residues from steel making) and MOE Waste Code 143 H (hazardous residuals from steel making).

Each of the companies was contacted to identify the waste streams in more detail and also to determine if storage of these wastes was still practiced.

Company No. 1 used to dispose of 1992 tonnes of bag house dust at an on-site landfill, however, the Certificate of Approval was amended so that this practice could not continue. The waste is now hauled off-site by a licenced carrier.

Table 3.3

SUMMARY OF INFORMATION ON
SIC 29 (PRIMARY METALS)

Company	Quantity (tonnes)	MOE Waste Class	Current Disposal Method
1	1,992	143 H	Hauled Off-site
2	960	143 T	On-site Landfill
2	29,520	143 N	Re-use at another facility
3	1,440	252 L	Dust Suppression
4	1,080	143 H	On-site

Most of the 30,480 tonnes reported by Company No. 2 is eventually re-used at another facility. Approximately 960 tonnes of this total is baghouse dust (MOE Code 143 T) which is landfilled on site. The remainder is blast furnace tailings and other scrubber dust, which is temporarily stored on site and dewatered prior to re-use at another facility. This material was incorrectly coded going to storage.

The 1,440 tonnes of used oil (MOE Waste Class 252 L) reported by Company No. 3 is stored on site for use as a dust supressant. Again, this material should not have been registered as going to storage.

The 1,080 tonnes of iron oxide waste, (MOE waste class 143 H) reported by Company No. 4 is "worked into the soil" at the plant, hence it is permanently disposed of on-site.

From the above discussion it can be seen that the 34,992 tonnes of material registered as going to storage by SIC 29 is not being stockpiled for future disposal.

SIC 6 (Mining)

One major stream (4700 tonnes of MOE waste class 146 T) was identified in SIC 6. All of this material is arsenic trioxide used to fill in underground mine stopes in the past.

This material will not be removed at a future time for disposal. Any arsenic trioxide produced on-site at this time is stored in a tank on-site and sold to a company in the U.S.

SIC 16 (Plastic Products)

One company contacted in SIC 16 had registered 18 tonnes of MOE waste code 267I (organic acids) in storage. Two waste materials are in storage at the plant. The first material is a mixture of stearic and palmatic acid with some polymerized MMA (methyl metacrylate) and oil. This material forms layers, approximately two thirds thick material and one third thin, hence it is difficult to handle and cannot be disposed of in Ontario at present as it reportedly would stick to the walls of material handling hoppers. The company used this material for approximately 3 years in the past, but have now altered their process so that waste material can be re-distilled in the U.S. However, 84 drums (15.5 tonnes) of this material are in storage at the site until a disposal option can be found. The second material in storage at this site is spill clean-up material which is contaminated with finished product, and cannot be re-used. Because of its thick consistency it has not been possible to dispose of this material in Ontario at present. Approximately 50 drums (10 tonnes) of this material is stored on-site at present. It is a mixture of acrylic polymer and light oil contaminated with spill clean-up materials. In this case, both materials are correctly registered as in storage.

SIC 32 (Transportation Equipment Industries)

A major stream of 455 tonnes of MOE waste code 121 H, (Alkaline and Heavy Metal Solutions) reported in SIC 32 was discussed with the generator. This is a metal finishing waste currently stored in a lagoon on-site. The company plan to decommission the lagoon during summer 1988. They anticipate dewatering the lagoon sludge on-site and disposing of the filter cake

at Tricil. A new treatment system consisting of bisulfide addition for chromium removal, and hypochlorite addition for cyanide destruction was recently installed at the site, hence the lagoon will not be used for process waste treatment in the future. The company has also recently registered approximately 34 tonnes of miscellaneous off-specification paints, adhesives, solvents, petroleum undercoating and cemented lagoon sludge which had accumulated at the site over the last 5 to 10 years. They hope to send all of this material to Tricil as part of a general clean-up planned for summer 1988. This example illustrates the fact that some companies did not register accumulated wastes in September 1986, but do so when they wish to dispose of the material. The same logic could have applied to the lagoon sludges, however this waste was probably registered because of the large volume involved. This was the only example of stored lagoon wastes which showed up on the generator registration database.

SIC 37 (Chemical and Chemical Products)

A major stream of 480 tonnes of explosives,(MOE waste code 321 H) identified in SIC 37 was identified as explosives or material contaminated with explosives and is stored by the company for short periods of time (reportedly a few days), and is either burned or landfilled on-site. For liability reasons this company does not want the explosive material to get out of their own hands, and would not remove this material off the property to a hazardous waste facility.

SIC 35 (Non-metallic Mineral Products)

One company in SIC 35 reported a stream of 324 tonnes of MOE waste class 146T in storage. Discussions with the company identified this waste stream as silicone carbide which was produced as a result of a furnace meltdown two years ago. The material is currently stored on site. The company hope to sell it as an inert fill material in a construction application, and discussions are underway with the MOE at

present on this option. Apparently the material has been tested recently, and the company report that it is non-hazardous, even though it was originally registered as leachate toxic. Metals in the soil are reported to have caused the initial hazardous results. This waste was produced as a result of a one time only event, and is not produced on an on-going basis.

SIC 4911 (Electric Power Systems Industry)

Six companies in SIC 4911 accounted for a total of approximately 170 tonnes of waste coded as going to storage in the generator registration database. Of this total, 48.25 tonnes was coded as MOE waste code 121L (Alkaline solutions, sludges and residues containing heavy metals). The generator was contacted but stated that no waste was produced at the site except for some waste oils. This stream is therefore assumed to be incorrectly coded. The remaining 122 tonnes of waste registered as going to storage is MOE class 251T, (petroleum based waste oils). Discussions with the generators indicated that each of these streams is a PCB contaminated oil, (with less than 50 ppm PCB's) being stored on-site. This material should have been registered as 243D.

SIC 8611 (Hospitals)

A hospital (SIC 8611) in northern Ontario was contacted regarding registration of 7 tonnes of pathological waste going to storage. This was reportedly a mistake, as they autoclave all pathological waste, and send it to the landfill within 24 hours. Any anatomical waste generated in the area is produced and disposed of at another hospital which has an on-site incinerator.

3.1.3 Comments on the Generator Registration Database

The telephone survey discussed above identified that at least 40,389 tonnes of the waste registered in the generator registration database as going to storage is not stored for an indefinite period and ultimate disposal of this waste was coded incorrectly.

The revisions to Regulation 309 which came into effect in September 1986 required that the MOE be informed of a companies intention to store waste for a period in excess of 90 days. This requirement was perceived by many firms as disapproval of storage as a waste handling practice, so many firms have ceased to store waste with the advent of the Regulation revisions. In fact, it is suspected that much waste which had been in storage for some time prior to September 1986, was disposed of prior to the September 15, 1986 deadline, after which it would require registration. Discussions with waste haulage companies at that time indicated a significant increase in business during the summer 1986 period. This was attributed to anxiety on the part of many firms to dispose of waste which had been stored at plants for a long time, in order to avoid the requirement to register old waste.

Waste generators need a waste class number when they intend to move waste material off-site. Some generators may not have registered old stockpiles of waste at their plants, and won't do so until the material is to be disposed of, even though they should have registered under the amendments to Regulation 309. This might also apply in a case such as a lagoon which is cleaned out every few years. Storage of wastes in lagoons is a practice which may not have been adequately covered by the Regulation 309 Registration procedure, as many industries may not have understood the requirement to register wastes which are to remain on-site.

In many cases encountered during the telephone interviews, wastes are stored for short periods of time in order to accumulate an economic quantity of waste for disposal. The disposal method for these wastes was incorrectly registered as storage by some generators.

3.2 THE CANVIRO DATABASE

3.2.1 Preliminary Review of CANVIRO Database

The CANVIRO database used in this study was developed in three separate projects carried out for the OWMC in 1983, 1984 and 1986. The purpose of the 1983 and 1984 studies, which involved 1,010 industrial interviews was to establish a marketing and waste quantities database to estimate total quantities of special wastes generated in Ontario, by utilizing a standard statistical sampling and extrapolation procedure. The third study involved interviews with an additional 207 companies, to augment information obtained during the earlier studies. For the current study, the three databases were combined into one master database.

Initially the master database was searched to retrieve all companies reporting "Long Term Storage" under the Disposal Method section.

Typically, these companies reported storage times of several months to one or two years. Only five companies from the total of 1,217 in the CANVIRO database reported both "long term storage" under disposal method and "indefinite" under storage time. Since this number is too small a percentage to allow for accurate extrapolation of results, and as it was suspected that even more companies may have stored wastes over the long term, a telephone survey was carried out of all companies reporting waste generation rates in excess of five tonnes per year and long term storage as a disposal method for these waste streams.

3.2.2 CANVIRO Database Telephone Survey

The above two criteria generated a list of 44 companies from the original CANVIRO database of 1,217 companies. Of this total, 18 (or 41%) were in SIC 37 (Chemical Products Industries),

8 (or 18%) were in SIC 29 (Primary Metals), 5 (11%) were in SIC 30 (Fabricated Metals), and the remainder belonged to nine other SIC groupings.

A telephone survey of these 44 companies was carried out as part of the study . Results of the survey are summarized in Table 3.4. Of the forty-four companies surveyed, one was out of business, and a second company refused to co-operate in the survey. Of the remaining forty-two, thirty-two did not store any wastes, or only stored waste until they had an economic quantity to haul away for disposal. A further three companies produced radioactive wastes which are outside the scope of this study. The remaining 7 companies stored wastes for a variety of reasons. Two companies temporarily stored wastes because of a dispute with the MOE on disposal of the material. Three companies were in the process of cleaning up stockpiles developed over a number of years, and anticipated that this work would be completed in 1988. The remaining two companies stored waste because of disposal difficulties. Some case studies encountered during the survey are discussed in the following sections.

Table 3.4
SUMMARY OF STORAGE SURVEY RESULTS

No. of Companies	Result
32	Do not store
7	Store
3	Radioactive
1	Refusal
1	Out of Business
44	Total

General Comments

One of the companies surveyed had difficulty disposing of one waste because it was an ignitable solid. However, the waste was stored out-doors at the plant for some time so

that the ignitable material was volatilized, and the flash point increased to a value where disposal did not present a problem. One paint company contacted stated that they were very careful not to produce paint sludges, as they were "impossible" to dispose of, however company representatives commented that if the OWMC prices were competitive enough, they might decide not to re-use all their sludges. Other companies reported difficulties disposing of sulfides. Apparently Tricil do not want to accept sulfides because of odour problems. Disposal difficulties were also reported for isocyanates.

Companies Involved in Clean-up of Old Waste Stockpiles

1. A urethane chemical producer reported having approximately 20 tonnes (100 drums) of chlorinated material on site, which Tricil will not accept due to its chlorine content. The company is trying to dispose of the waste, as it is taking up space at the plant, and they are anxious to "get it off the books" and inform the MOE that it has been removed off-site. This waste material stockpile has built up over a number of years and the company intends to dispose of it all in 1988.

2. A paint manufacturer reported having 400 to 500 drums of mixed paint wastes, including some vinyl chloride resin, on-site in 1986. They have since disposed of all of this material. Company Management released $80,000 to accomplish this following difficulty encountered with waste disposal at another facility. All of the drums had been removed off-site and disposed of in the U.S. by the end of October 1987.

3. Information was obtained from the MOE on one company which had approximately 600 tonnes (3,000 drums) of various chemicals, such as mixed organics, various

states of phenolic resins, toluenes, toluols, and tetrolyn sludges in storage on site in 1986. They disposed of approximately 1,000 of these drums in 1987, and $30,000 to $40,000 per year has been allocated to continue the clean-up, which is expected to be completed by the end of 1988.

This company was not included in the CANVIRO database, and was not interviewed as part of the study, however this example illustrates that many old stockpiles of waste are systematically being depleted.

4. A paint company who refused to co-operate in the survey was reported (by MOE personnel) to have a stockpile of approximately 70 tonnes (300 - 400 drums) of mixed waste on their property which will be disposed of between 1988 and 1990. Approximately 15 tonnes (71 drums) of this material were removed in 1988.

5. A mining chemical manufacturer reported having approximately 1 tonne (a few drums) of mixed organic chemicals and concrete coating agents in storage from past processes. As part of a general clean-up, they intend to be rid of these wastes by mid-1988. They do not anticipate having any trouble sending them to Tricil. This company has also changed waste handling procedures at their laboratory since the revisions to Regulation 309, and now store wastes for less then 3 months prior to disposal. Previously waste laboratory solvents were stored for 2-3 years prior to disposal.

Companies Storing Wastes Because of Disposal Difficulties

1. A refinery reported producing a caustic waste during turnaround operations. The waste caustic is presently injected into the desalters for pH control, however this creates problems as it tends to settle out in the

process water. This process is almost in balance with the turnarounds, which occur on average once every 1.5 years, however there is still an excess of a few drums left when it is time for another turnaround. Tricil will generally not take this material, as it is high in mercaptans which cause odour problems. At present an estimated 2 tonnes of this material is stored on-site. The company is currently investigating disposal options in the U.S.

2. A paint dryer manufacturer reported storing approximately 29 tonnes (60 or 70 drums) of a solid waste consisting of filter soil, mineral spirits, heavy metals and diatomaceous earth. The material has a flash point of less than 60°C, and is classed as an ignitable solid. They have recently shipped approximately 10 tonnes (21 drums) which had been stored on-site for a number of years, to the United States. In some cases, the solvent is stripped from the solid waste in one of the industries reactors. This increases the flash point to above 61°C, so that Tricil can accept the waste. However, the company does not like to do this, as it ties up production equipment. A company representative commented that if a facility existed in Ontario which could accept this waste without pre-treatment they would definately use this service. This waste is produced at a rate of approximately 13 tonnes per year.

Companies Involved in Disputes with MOE Regarding Waste Disposal

1. A steel container manufacturer reported that for the past 30 years they have disposed of paint sludge in a municipal landfill site. Recently, however, the MOE changed the waste classification from non-hazardous to 145H, (paint sludge with paint thinners such as xylene). The company maintains that there is no xylene in the

sludge. They have accumulated approximately 8 tonnes of this waste and disposal options are still being discussed with the MOE. The company feels that if the wastes cannot go to a licenced landfill, it is very likely that Tricil will accept the waste. The company produces approximately 16 tonnes per year of this waste.

2. A chlorine manufacturer reported storing some sludges containing organics, inorganics and mercury at present. The MOE want to classify the waste as hazardous (Schedule 1) and the company, who disposed of this material in a municipal landfill in the past, wants to continue this practice. They feel that they have proven to the MOE that the mercury will not leach out of the sludge, and hence that it is a non-hazardous material. Approximately 32 tonnes of this material is stored on site at present, until this issue is resolved.

3.2.3 Survey Conclusions

Most of the companies contacted in SIC 29 (Primary Metals) stored PCB wastes, which were not of interest to the present study. Of the seven companies who currently store waste, including those cleaning up old stockpiles and those disputing waste disposal with the MOE five are in SIC 37 (Chemicals and Chemical Producers) and the remaining two are in SIC 30 and SIC 36. In all but one of the above cases, relatively small quantities of stored waste were identified, varying from 1-32 tonnes per establishment. One major stockpile of approximately 70 tonnes of waste was identified. The reasons for storing waste included difficulties in disposing of the material in Ontario, disputes with the MOE over appropriate disposal methods, and wastes which still remained from gradual depletion of old waste stockpiles. Results of the positive responses are summarized in Table 3.5.

Table 3.5
CANVIRO SURVEY
SUMMARY OF WASTE QUANTITIES STORED AND
REASONS FOR WASTE STORAGE

Company	SIC	Quantity Stored (tonnes)	Reason
A	3731	20	Old Stockpile
B	3611	2	Difficult to Dispose
C	3751	15	Difficult to Dispose
D	3721	1	Old Stockpile
E	3042	8	Dispute with MOE
F	3712	32	Dispute with MOE
G	3751	70	Old Stockpile
Total		148	

The results of the CANVIRO database telephone survey indicated that since the advent of the revisions to Regulation 309 in September 1986, many companies are much more aware of storage being an unacceptable method of waste management. This perception results from the requirement to notify the MOE of an intention to store waste for a period in excess of 90 days, also from MOE district offices efforts (discussed in Section 3.3) to actively discourage stockpiling and long term storage of wastes. In general, annual flows of waste going to storage as a waste management method were not identified.

Discussions with waste haulers indicate that they were exceptionally busy in Summer 1986, prior to the September 15, 1986 Regulation 309 Registration deadline. It was suspected that this activity was related to companies which had stored wastes for a number of years wanting the material removed from the premises to avoid having to register the waste numbers on the generator registration form.

All of the above factors have probably significantly depleted stockpiles of old wastes which had been accumulated over a number of years prior to 1986. Hence, at this time, the inventory of stored waste in the Province is probably significantly smaller than it was prior to September 1986, and with various MOE efforts it will continue to decrease over the next year or so.

3.3 MOE DISTRICT OFFICES

The MOE District offices were contacted by CANVIRO in order to locate waste storers that were not identified in either the generator registration or the CANVIRO data bases. In most of the discussions, the MOE officer indicated that they were not aware of any long term storers in their district, as the only accepted reason for special waste storage beyond 90 days was to accumulate an economic quantity to be hauled away. Storage of PCB's is widespread but is not addresssed in this study. Offices in Northern Ontario reported storage of small quantities of pathological waste from hospitals. This material is stored in freezers until an economic quantity is accumulated to justify a trip for a licenced hauler to dispose of the material.

Some of the District offices in Eastern Ontario have put pressure on generators that store waste for periods in excess of one year by forcing them to register as transfer facilities or waste receivers if they wish to continue this practice. Most companies do not wish to go through the process as it requires submitting an application and attending a public hearing. Hence, the above approach by the MOE has significantly reduced indefinite storage as a waste handling practice.

One MOE officer in Eastern Ontario commented on an industry in his district which stored waste, and did not show up in either the generator registration or CANVIRO data bases.

This company had approximately 600 tonnes (3000 drums) of various chemicals, such as mixed organics, various states of phenolic resins, toluenes, toluols, and tetrolyn sludges in storage on site in 1986. They disposed of approximately 1000 of these drums in 1987, and $30,000 to $40,000 per year has been allocated to continue the clean-up, which is expected to be completed by the end of 1988. Information was obtained from a second MOE office on a smaller waste stockpile of 300 - 400 drums in western Ontario. The local MOE office is putting pressure on the company to dispose of this stockpile between 1988 and 1990. These were the only examples reported by MOE officers of industries which still had large stockpiles of wastes to be disposed.

The above discussion illustrates that the MOE District offices are making a concerted effort to eliminate any remaining stockpiles of subject waste in the Province, and the results of the telephone survey conducted as part of this study indicate that they have been quite successful in doing so.

3.4 CANADIAN CHEMICAL PRODUCERS ASSOCIATION SURVEY

The Canadian Chemical Producers Association (CCPA) is currently updating a survey on waste generation and disposal practices by their members, which include approximately 70 companies across Canada, 40-50 of which have facilities in Ontario. As the chemical industry (SIC 37) was identified as the major waste storer in the CANVIRO telephone survey, the results of the survey should be reviewed when available to identify any difficulties encountered with waste disposal.

3.5 ESTIMATE OF WASTE IN STORAGE IN ONTARIO

The three sources of information consulted during this study agree that there appears to be a low level of accumulated subject wastes in storage in Ontario.

From the data available, it also appears that the nature of the waste storage involves a small number of large waste stockpiles, in the 300-400 tonne size range. Three such cases were identified during the study, two in the generator registration database, and a third identified by MOE personnel. It is also noted that no large waste stockpiles were identified through the CANVIRO database survey.

The generator registration database should contain information from every establishment producing or dealing with subject waste in the Province, and accounting for errors in registration, or changes discussed in Section 3.1, this database produces a storage quantity of approximately 923 tonnes, 41 tonnes of which is attributable to the non-manufacturing sector (SIC groups 0-9, 40-99). Two companies accounted for almost 800 tonnes of the total accumulated waste identified in the generator registration database.

The results of the telephone survey developed from the CANVIRO database identified a total of 148 tonnes of waste in storage. This data was extrapolated to yield an estimated quantity of subject wastes stored in Ontario by the Manufacturing sector (SIC groups 10 to 39). If SIC groupings are ignored and the results are extrapolated using the standard methods of a Simple Random Survey, the quantity of subject waste in storage by manufacturers is projected at approximately 1,800 tonnes. If the results of the telephone survey are extrapolated by SIC group, then a lower figure of 500 tonnes is arrived at. Strictly speaking, the CANVIRO database is biased toward SIC groups that were suspected of being producers of subject waste and thus the value obtained using the techniques of a Simple Random Survey should be an over estimate. However, because of the nature of waste stored, ie. that a few isolated companies have large stockpiles, and also because the one stockpile identified through the survey of the CANVIRO database was relatively small (70 tonnes) it is suspected that the above extrapolation is an underestimate, depending on

how many outliers (such as the case of 400 tonnes identified by the MOE in Eastern Ontario) exist. Because of the low number of positive responses obtained in the survey, the principles of a stratified sample survey yielded an even lower total estimate, and was not considered appropriate in this case. A representative sample for this study would be difficult to develop for prediction purposes because of the small number of companies who store waste, and the relatively large quantity of waste that is stored in these cases. The limitations on the number of industries which can be practically sampled limit the value of projections based on the results obtained.

The 1,800 tonne figure calculated using results of the CANVIRO database survey is an estimate based on a survey of 44 firms selected from a population of 1,217 firms, representing somewhat over 5% of the manufacturing establishments in the Province. Strictly speaking only 0.2% of the manufacturing establishments were surveyed and only 7 positive responses were received.

For the non-manufacturing sectors, namely SIC groups 0-9, and 40-99, the generator registration database was the only information on hand, and yielded a total of 41 tonnes, when one major stream in the mining sector (SIC 6), and streams in the electrical power sector (SIC 4911) and the hospital sector (SIC 86) were eliminated for reasons discussed in Section 3.1. The Regulation 309 registration process may not include all waste stored by the non-manufacturing sector, because of lack of understanding of the registration procedure, particularly by smaller service industries. However, these would not be expected to store large quantities of waste.

In summary, the three data sources used for the study identified a total of 1,471 tonnes of waste in storage in Ontario, 923 tonnes from the generator registration database, 148

tonnes in the CANVIRO database survey, and 400 tonnes in the Eastern Ontario, identified by the MOE. Results of the CANVIRO database were extrapolated to yield an estimated total of 1,800 tonnes for the Province, which is considered and underestimate for reasons discussed earlier. However, the actual quantity is not expected to be significantly greater than this estimate, and a value of 3,000 - 4,000 tonnes is probably a reasonable upper bound on this total. This total does not include PCB's in storage in Ontario. These quantities are maintained by the MOE Waste Management Branch and are being updated at present. The above total does not include special wastes in storage in lagoons across the Province. It is suspected that these wastes were not captured in the Regulation 309 registration procedure, again due to a lack of understanding of registration requirements. Also, the above totals do not include wastes stored until an adequate quantity is collected for economical disposal off-site.

Chapter 4

CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

1. The generator registration database indicated a total of 41,312 tonnes of special waste in storage in the Province. Of this figure 40,389 tonnes is not stored indefinately. Most of this material is stored for short periods of time and then re-used, some of the material is permanently disposed of on-site, waste handling practices for some of this material have changed since September 1986, and disposal of some material was coded incorrectly in the generator registration database.

2. The annual flow of waste to long term storage as a handling method is minimal.

3. Storage of waste material has decreased and the attitude of industry to storage of waste has changed significantly with the advent of the revisions to Regulation 309 in September 1986. The MOE actively discourages storage of waste for a period in excess of 90 days unless it is being accumulated to produce an economic quantity for removal off-site. Stockpiles of accumulated waste which had existed in the Province prior to September 1986 and had accumulated over a number of years, have been significantly depleted because of these factors.

4. All of the accumulated stored waste identified in the CANVIRO database was in major SIC groups 30, 36, and 37 with SIC 37 (Chemical Industries), being the major

contributor. Within this group paint companies appear to have accumulated waste stockpiles to the greatest extent.

5. Based on the results of this study, it is estimated that more than 1,800 tonnes of subject waste is stored in the Province at present. An upper bound of 3,000 to 4,000 tonnes is considered reasonable for this total, which is an accumulated total, and excludes wastes stored for short periods of time to collect an economical quantity for removal off-site. This accumulated total is expected to decrease with time, as the MOE forces more industries to clean-up old waste stockpiles. The above total does not include wastes stored in lagoons throughout the Province, or PCB wastes in storage throughout the Province.

4.2 RECOMMENDATIONS

1. This study should be updated after the results of the CCPA (Canadian Chemical Producers Association) waste study become available.

Chapter 5
REFERENCES

1. CANVIRO Consultants, March 1985, "Market Assessment Program Survey of 1000 Industrial Establishments." Prepared for the Ontario Waste Management Corporation.

2. CANVIRO Consultants, March 1987, "Phase III Special Waste Survey of Ontario Manufacturing Establishments" Draft Report prepared for the Ontario Waste Management Corporation.

3. Ministry of the Environment, July 1985, "Registration Guidance Manual for Generators of Liquid Industrial and Hazardous Waste".

APPENDIX A

List of Contacts

LIST OF CONTACTS

Name	Affiliation	Telephone Number
Mr. M. Perreault	Dupont Canada Inc., North Bay	(705) 472-1300
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Mr. S. Aldred	Stelco, Hamilton	(416) 367-1450
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Mr. P. Dion	Ontario Hydro, Wesleyville	(416) 885-2515
Mr. F. Hall	Toronto Hydro, Toronto	(416) 595-6462
Mr. D. Clark	Flindall's Cleaners, Kingston	(613) 548-4407
Mr. F. Craig	Algoma Steel, Sault St. Marie	(705) 945-2437
Ms. M. Searle	Sudbury Memorial Hospital, Sudbury	(705) 671-1000
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Mr. F. Fathers	Cae Metal Abrasive Division, Welland	(416) 735-4691
Mr. W. Yundt	Yundt Brothers Construction Ltd., Stratford	(519) 271-7830
Mr. C. Chicerelli	General Abrasive Canada, Niagara	(416) 358-3646
Mr. N. Sandford	Oakville Hydro Electric Commission, Oakville	(416) 358-3646
Mr. M. Timmins	Campbell Red Lake Mines	(807) 735-2075
Mr. D. Porter	Atlas Specialty Steels, Welland	(416) 735-5661
Mr. R. Van Engen	Liquid Carbonic, Paris	(519) 442-6373
Mr. L. Marshall	Badische Canada Ltd., Ottawa	(613) 623-3191
Mr. P. Moore	CIL, Mississauga	(416) 678-9150
Mr. D. Christopher	Celanese, Millhaven	(613) 389-2210

Name	Affiliation	Telephone Number
Mr. J. Ferris	Petrocan Products Inc., Oakville	(416) 827-1161
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Mr. D. Reid	Inco Ltd., Port Colborne	(416) 834-3611
Mr. C. Hearst	Precious Plate Ltd., Mississauga	(416) 678-6611
Mr. R. Gurman	Otis Elevator, Hamilton	(416) 578-6277
Mr. W. Hovi	Bay Wood Processing, Thunder Bay	(807) 344-8464
Mrs. I. Fraser	Nuodex Canada Ltd., Toronto	(416) 421-3100
Mr. R. Bouchet	Iroquois Chemicals Ltd., Cornwall	(613) 932-8960
Mr. T. Dupuis	Welland Chemical Ltd., Sarnia	(519) 336-2287
Mr. S. Rosen	Selectone Paints, Weston	(416) 742-8881
Mr. G. Bugiardini	Burlington Steel, Hamilton	(416) 549-4774
Mr. W. Smith	Superior Metal Finishing, London	(519) 686-0803
Mr. D. Cunningham	Cyanamid Canada Inc., Niagara Falls	(416) 356-9000
Mr. G. Murdoch	Spruce Falls Power and Paper Co., Kapuskasing	(705) 337-1311
Mr. R. Ellard	Boise Cascade Canada, Kenora	(807) 468-6411
Mr. Michelutti	Falconbridge Nickel Mines Ltd.	(705) 693-2761
Mr. B. Bell	Inco Ltd.	(705) 682-8341
Mr. J. Davidson	Alcan Canada Ltd.	(613) 541-7007
Mr. D. Smith	Manis Metal Manufacturing Ltd.	(613) 746-4663
Mr. R. Tweedle	Greif Containers Inc.	(416) 644-4433
Mr. E. Hofer	Rheem Canada	(416) 842-1472
Ms. B. Richardson	D & C Roussy Industries Ltd.	(519) 452-3661
Mr. J. Owen	IBM Canada, Toronto	(416) 448-5548
Mr. K. Gregory	Beachville Lime Ltd. (Plant 2)	(519) 423-6283

Name	Affiliation	Telephone Number
Mr. T. Kierstad	Petrosar Ltd., Corunna	(519) 862-2911
Mr. R. Holden	General Chemical Canada Ltd.	(416) 227-1532
Mr. B. Compton	Cornwall Chemicals Ltd., Cornwall	(613) 938-5500
Mr. R. Lepine	Allied Chemical Inc.	(519) 736-2111
Mr. B. Grahame	A. Shulman Canada Ltd.	(519) 633-3451
Mr. R. Loronger	Korlin Concentrates	(519) 271-1680
Mr. D. Dickson	Dupont Canada	(613) 544-6000
Mr. G. Kopulos	International Paints Ltd.	(416) 252-5171
Mr. D. Shearer	CCL, Concord	(416) 669-9855
Mr. P. Birrell	General Motors of Canada, St. Catharines	(416) 641-4120
Mr. W. Hockett	General Motors of Canada, Oshawa	(416)644-5095
Mr. S. Radcliffe	MOE, Waste Management Branch	(416) 323-5188
Ms. L. Cooper	MOE, Sudbury	(705) 675-4501
Mr. A. Oberholzer	MOE, Peterborough	(705) 743-2972
Mr. B. Thompson	MOE, Muskoka-Haliburton	(705) 687-3408
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Name	Affiliation	Telephone Number
Mr. D. Finlayson	CCPA, Ottawa	(613) 237-6215
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APPENDIX B

MOE Waste Classes

MOE WASTE CLASSES

INORGANIC WASTES

		Examples
Acid Solutions		
111	Spent pickle liquor	- Acid solutions of sulphuric and hydrochloric acids containing ferrous salts from steel pickling.
112	Acid solutions, sludges and residues containing heavy metals	- Solutions of sulphuric, hydrochloric and nitric acids containing copper, nickel, chromium, zinc, cadmium, tin, lead or other heavy metals; chromic acid waste; acidic emission control sludges from secondary lead smelting.
113	Acid solutions, sludges and residues containing other metals and non-metals	- Solutions of sulphuric, hydrochloric, hydrofluoric and nitric acids containing sodium, potassium, calcium, magnesium or aluminum; equipment cleaning acids; cation regenerant; reactor acid washes; catalyst acid and acid washes.
114	Other inorganic acid wastes	- Off-specification acids; by-product hydrochloric acid; dilute acid solutions; acid test residues.
Alkaline Solutions		
121	Alkaline solutions, sludges and residues containing heavy metals	- Metal finishing wastes; plating baths; spent solutions containing metals such as copper, zinc, tin, cadmium; case hardening sludges; spent cyanide destruction residues; dewatered solids from metal and cyanide finishing wastes and cyanide destruction.
122	Alkaline solutions, sludges and residues containing other metals and non-metals, not containing cyanides	- Alkaline solutions from aluminum surface coating and etching; alkali cleaner wastes; waste lime sludges and slurries; anion regenerants.
123	Alkaline phosphates	- Bonderizing wastes; zinc phosphates; ferrous phosphates; phosphate cleaners.

Aqueous Salts

		Examples
131	Neutralized solutions, sludges and residues containing heavy metals	- Metal finishing waste treatment sludges containing copper, nickel, chromium, zinc or cadmium; neutral salt bath sludges and washes; lime sludge from metal finishing waste treatment; dewatered solids from these processes.
132	Neutralized solutions, sludges and residues containing other metals	- Aluminum surface coating treatment sludges; alum and gypsum sludges.
133	Brines, chlor-alkai sludges and residues	- Waste brines from chlor-alkali plants; neutralized hydrochloric acid; brine treatment sludges; dewatered solids from brine treatment.
134	Wastes containing sulphides	- Petroleum aqueous refinery condensates.
135	Wastes containing other reactive anions	- Wastes containing chlorates; hypochlorite; bromate or thiosulphate.

Miscellaneous Inorganic Wastes and Mixed Wastes		Examples
41	Inorganic wastes from pigment manufacturing	- Wastewaters and sludges from the production of chrome yellow, molybdate orange, zinc yellow, chrome green and iron pigments; dewatered solids from these sources.
42	Primary lead, zinc and copper smelting wastes	- Slurries, sludges and surface impoundment solids; treatment plant sludges; anode slimes and leachate residues; dewatered solids from these sources.
43	Residues from steel making	- Emission control sludges and dusts; precipitator residues from steel plants; dewatered solids from these sources.
44	Liquid tannery waste sludges	- Lime waste mixtures; chrome tan liquors; dehairing solutions and sludges.
45	Wastes from the use of paints, pigments and coatings	- Paint spray booth sludges and wastes; paper coating wastes; ink sludges; paint sludges.
46	Other specified inorganic sludges, slurries or solids	- Flue gas scrubber wastes; wet fly ash; dust collector wastes; metal dust and abrasives wastes; foundry sands; mud sediment and water; tank bottoms from waste storage tanks that contained mixed inorganic wastes; heavy sludges from waste screening/filtration at transfer/processing sites not otherwise specified in this table.
47	Chemical fertilizer wastes	- Solutions, sludges and residues containing ammonia, urea, nitrates and phosphates from nitrogen fertilizer plants.
48	Miscellaneous waste inorganic chemicals	- Waste inorganic chemicals including laboratory, surplus or off-specification chemicals, that are not otherwise specified in this table.
49	Landfill leachate	- Surface run-off and leachate collected from landfill sites.
50	Inert inorganic wastes	- Sand and water from catch basins at car washes; slurries from the polishing and cutting of marble.

ORGANIC WASTES

		Examples
Non-halogenated Spent Solvents		
211	Aromatic solvents and residues	- Benzene, toluene, xylene solvents and residues.
212	Alphatic solvents and residues	- Acetone, methylethylketone and residues, alcohols, cyclohexane and residues.
213	Petroleum distillates	- Varsol, white spirits and petroleum distillates, thinners.
Fuels		
221	Light fuels	- Gasoline, kerosene, diesel, tank drainings/washings/bottoms, spill clean-up residues.
222	Heavy fuels	- Bunker, asphalts, tank drainings/washings/bottoms, spill clean-up residues.
Resins and Plastics		
231	Latex wastes	- Waste latexes, latex crumb and residues.
232	Polymeric resins	- Polyester, epoxy, urethane, phenolic resins, intermediates and solvent mixtures.
233	Other polymeric wastes	- Off-specification materials, discarded materials from reactors.

Halogenated Organic Wastes		Examples
241	Halogenated solvents and residues	- Spent halogenated solvents and residues such as perchloroethylene, trichloroethylene and carbon tetrachloride (dry cleaning solvents); halogenated still bottoms; residues and catalysts from halogenated hydrocarbon manufacturing or recycling processes.
242	Halogenated pesticides and herbicides	- 2,4-D, 2,4,5-T wastes, chlordane, mirex, silvex, pesticide solutions and residues.
243	Polychlorinated biphenyls (PCB)	- Askarel liquids such as Aroclor, Pydraul, Pyranol, Therminols, Inerteen, and other PCB contaminated materials.
Oily Wastes		
251	Waste oils/sludges (petroleum based)	- Oil/water separator sludge; dissolved air flotation skimming; heavy oil tank drainage; slop oil and emulsions.
252	Waste crankcase oils and lubricants	- Collected service station waste oils; industrial lubricants; bulk waste oils.
253	Emulsified oils	- Soluble oils; waste cutting oils; machine oils.
254	Oily water/waste oil from waste transfer/ processing sites	- Waste oil and oily water limited to classes 251, 252 and 253 that have been bulked/blended/processed at a waste transfer/processing site.

Miscellaneous Organic Wastes and Mixed Wastes		Examples
261	Pharmaceuticals	- Pharmaceutical and veterinary pharmaceutical wastes other than biologicals and vaccines; solid residues and liquids from veterinary arsenical compounds.
262	Detergents and soaps	- Laundry wastes.
263	Miscellaneous waste organic chemicals	- Waste organic chemicals including laboratory surplus or off-specification chemicals that are not otherwise specified in this table.
264	Photoprocessing wastes	- Photochemical solutions, washes and sludges.
265	Graphic arts wastes	- Adhesives; glues; miscellaneous washes; etch solutions.
266	Phenolic waste streams	- Cresylic acid; caustic phenolates; phenolic oils; creosote.
267	Organic acids	- Carboxylic or fatty acids; formic, acetic, propionic acid wastes; sulphamic and other organic acids that may be amenable to incineration.
268	Amines	- Waste ethanolamines; urea; tolidene; Flexzone waste; Monex waste.
269	Organic non-halogenated pesticide and herbicide wastes	- Organophosphorus chemical wastes; arsenicals; wastes from MSMA and cacodylic acid.
270	Other specified organic sludges, slurries and solids	- Tank bottoms from mixed organic waste bulking tanks at waste transfer sites; mixed sludges from waste screening/filtration at waste transfer/ processing sites not otherwise specified in this table.

		Examples
Processed Organic Wastes from Transfer Stations		
281	Non-halogenated rich organics	- Blended/bulked non-halogenated solvents, oils and other rich organics prepared at transfer/processing sites for incineration.
282	Non-halogenated lean organics	- Blended/bulked aqueous wastes prepared at transfer/processing sites for incineration and contaminated with non-halogenated solvents, non-halogenated oils and other non-halogenated organics.
Plant and Animal Wastes		
311	Organic tannery wastes	- Fleshings; trimmings; vegetable tan liquors; Bate solutions
312	Pathological wastes	- Human anatomical waste; infected animal carcasses; other non-anatomical waste infected with communicable diseases; biologicals and vaccines.
Explosive Manufacturing Wastes		
321	Wastes from the manufacture of explosives and detonation products	- Wastewater treatment sludges; spent carbon; red/pink waters from TNT manufacturing; residues from lead base initiating compounds.
Compressed Gases		
331	Waste compressed gases, including cylinders	- Methane (natural gas); nitrous or nitric oxide; propane; butane.